WHAT IS CLAIMED IS:

1. A supporting structure for supporting an optical element comprising:

a first supporting member for supporting the optical element;

a second supporting member arranged in the outer diameter side of the first supporting member for supporting the first supporting member; and

an elastic member placed between the first supporting member and the second supporting member in the radial direction, the inner diameter side of the elastic member being connected to the first supporting member while the outer diameter side of the elastic member being connected to the second supporting member, the elastic member being elastically deformable in the radial direction,

wherein the first supporting member does not contact the second supporting member in the axial direction.

2. A structure according to Claim 1, wherein the value of the thermal expansion coefficient of the first supporting member is between those of the optical element and the second supporting member.

3. A structure according to Claim 1, wherein the

thermal expansion coefficient difference between the optical element and the first supporting member is smaller than the thermal expansion coefficient difference between the optical element and the second supporting member.

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4. A structure according to Claim 3, wherein the optical element is made from quartz and the first supporting member is made from an alloy including nickel.

5. A structure according to Claim 3, wherein the optical element is made from quartz and the first supporting member is made from one of a cordierite ceramic material including magnesium oxide and silicon oxide, a ceramic material including alumina and silicon nitride, and Zerojule (TM) which is glass with low thermal expansion.

6. A structure according to Claim 3, wherein the optical element is made from fluorite and the first supporting member is made from an alloy including copper.

7. A structure according to Claim 3, wherein the optical element is made from fluorite and the first supporting member is made from one of an alloy of iron-chromium-nickel such as 18-8 stainless steel and an alloy including aluminum as a principal ingredient.

8. A structure according to Claim 1, wherein the values of the thermal expansion coefficient of the optical element, the first supporting member, and the second supporting member are substantially the same.

9. A structure according to Claim 1, wherein the elastic member is a plate-shaped spring member in which both ends thereof are connected to the first supporting member and the central portion thereof is connected to the second supporting member, and wherein a plurality of the plate-shaped spring members are arranged in peripheral portions of the first supporting member at substantially equal intervals.

10. A structure according to Claim 1, wherein the elastic member is made from the same material as that of the first supporting member.

11. A structure according to Claim 1, wherein the optical element is one of a lens, a mirror, and an optical element to which diffraction is applied.

12. An exposure apparatus comprising:

an illuminating optical system for illuminating a reticle with a light beam from a light source; and

a projection optical system for projecting a light beam from the reticle on a wafer,

wherein the illuminating optical system and/or the projection optical system have a supporting structure for supporting an optical element according to Claim 1.

13. A method for manufacturing semiconductor devices and comprising an exposing step by an exposure apparatus according to Claim 12.

14. A supporting structure for supporting an optical element comprising:

an optical element;

a first supporting member for supporting the optical element; and

a second supporting member for supporting the first supporting member, the second supporting member being made from a material different from that of the first supporting member,

wherein the thermal expansion difference between the optical element and the first supporting member is smaller than the thermal expansion difference between the optical element and the second supporting member.

15. A structure according to Claim 14, wherein the

thermal expansion coefficient of the first supporting member is an intermediate value between thermal expansion coefficient values of the optical element and the second supporting member.

16. A structure according to Claim 14, wherein thermal expansion coefficient values of the optical element, the first supporting member, and the second supporting member substantially agree with each other.

17. A structure according to Claim 14, wherein the optical element is made from quartz and the first supporting member is made from an alloy including nickel.

18. A structure according to Claim 14, wherein the optical element is made from quartz and the first supporting member is made from one of a cordierite ceramic material comprising magnesium oxide and silicon oxide, a ceramic material comprising alumina and silicon nitride, and Zerojule (TM) which is glass having low thermal expansion.

19. A structure according to Claim 14, wherein the optical element is made from fluorite and the first supporting member is made from an alloy including copper.

20. A structure according to Claim 14, wherein the optical element is made from fluorite and the first supporting member is made from one of an alloy of iron-chromium-nickel such as 18-8 stainless steel and an alloy including aluminum as a principal ingredient.

21. A structure according to Claim 14, wherein the second supporting member supports the first supporting member via an elastic member which is elastically deformed in the radial direction.

22. A structure according to Claim 21, wherein the elastic member is made from a plate-shaped spring member in which both ends of the spring member are connected to the first supporting member and the central portion thereof is connected to the second supporting member, and wherein a plurality of the plate-shaped spring members are arranged in the periphery of the first supporting member at substantially equal intervals.

23. A structure according to Claim 21, wherein the elastic member is made from the same material as that of the first supporting member.

24. A structure according to Claim 14, wherein the

optical element is one of a lens, a mirror, and an optical element to which diffraction is applied.

25. An exposure apparatus comprising:

an illuminating optical system for illuminating a reticle with a light beam from a light source; and

a projection optical system for projecting a light beam from the reticle on a wafer,

wherein the illuminating optical system and/or the projection optical system have a supporting structure for supporting an optical element according to Claim 14.

26. A method for manufacturing semiconductor devices comprising an exposing step by an exposure apparatus according to Claim 25.

27. A supporting structure for supporting an optical element comprising:

an optical element made from fluorite;

a first supporting member for supporting the optical element; and

a second supporting member made from a material different from that of the first supporting member for supporting the first supporting member,

wherein the thermal expansion difference between the

optical element and the first supporting member is within ± 10%.

28. A structure according to Claim 27, wherein the first supporting member is made from an alloy including copper.

29. A structure according to Claim 27, wherein the second supporting member supports the first supporting member via an elastic member which is elastically deformed in the radial direction, and wherein the first supporting member does not contact the second supporting member in the optical axial direction of the optical element.

30. A structure according to Claim 27, wherein the difference in the thermal expansion coefficient between the optical element and the first supporting member is smaller than the difference in the thermal expansion coefficient between the optical element and the second supporting member.

31. A structure according to Claim 27, wherein the first supporting member is made from an alloy of copper-zinc having a thermal expansion coefficient being substantially identical to that of fluorite.

32. An exposure apparatus comprising:

an illuminating optical system for illuminating a reticle with a light beam from a light source; and

a projection optical system for projecting a light beam from the reticle on a wafer,

wherein the illuminating optical system and/or the projection optical system have a supporting structure for supporting an optical element according to Claim 27.

33. A method for manufacturing semiconductor devices comprising an exposing step by an exposure apparatus according to Claim 32.

34. A supporting structure for supporting an optical element comprising:

a plurality of optical elements;

a plurality of first supporting members for respectively supporting the plurality of optical elements; and

a plurality of second supporting members for respectively supporting the plurality of first supporting members via structures having elasticity in the radial direction of the optical element.

35. A structure according to Claim 34, wherein the

plurality of first supporting members do not contact each other.

36. A structure according to Claim 34, wherein the plurality of first supporting members do not contact the plurality of second supporting members in the optical axial direction of the optical element.

37. A structure according to Claim 35, wherein the plurality of first supporting members do not contact the plurality of second supporting members in the optical axial direction of the optical element.

38. A structure according to Claim 34, wherein the radial clearance between the optical element and the first supporting member is filled with adhesive along the whole circumference of the optical element.

39. A structure according to Claim 34, wherein the radial clearance between the optical element and the first supporting member is discontinuously filled with adhesive in a plurality of portions on the circumference of the optical element.

40. A structure according to Claim 34, wherein the

thermal expansion coefficient of the first supporting member is an intermediate value between thermal expansion coefficient values of the optical element and the second supporting member.

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41. A structure according to Claim 34, wherein thermal expansion coefficient values of the optical element, the first supporting member, and the second supporting member are substantially the same.

42. A structure according to Claim 34, wherein the thermal expansion difference between the optical element and the first supporting member is smaller than the thermal expansion difference between the optical element and the second supporting member.

43. A structure according to Claim 34, wherein the optical element is made from quartz and the first supporting member is made from an alloy including nickel.

44. A structure according to Claim 34, wherein the optical element is made from quartz and the first supporting member is made from one of a cordierite ceramic material comprising magnesium oxide and silicon oxide, a ceramic material comprising alumina and silicon nitride, and

Zerojule (TM) which is glass having low thermal expansion.

45. A structure according to Claim 34, wherein the optical element is made from fluorite and the first supporting member is made from an alloy including copper.

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46. A structure according to Claim 34, wherein the optical element is made from fluorite and the first supporting member is made from one of an alloy of iron-chromium-nickel such as 18-8 stainless steel and an alloy including aluminum as a principal ingredient.

47. A structure according to Claim 34, wherein the elastic member is made from a plate-shaped spring member in which both ends of the spring member are connected to the first supporting member and the central portion thereof is connected to the second supporting member, and wherein a plurality of the plate-shaped spring members are arranged in the periphery of the first supporting member at substantially equal intervals.

48. A structure according to Claim 34, wherein the elastic member is made from the same material as that of the first supporting member.

49. A structure according to Claim 34, wherein the optical element is one of a lens, a mirror, and an optical element to which diffraction is applied.

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50. An exposure apparatus comprising:

an illuminating optical system for illuminating a reticle with a light beam from a light source; and

a projection optical system for projecting a light beam from the reticle on a wafer,

wherein the illuminating optical system and/or the projection optical system have a supporting structure for supporting an optical element according to Claim 34.

51. A method for manufacturing semiconductor devices comprising an exposing step by an exposure apparatus according to Claim 50.

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